

Appl. No. 10/688,228
Amdt. dated July 2, 2004
Reply to Office action of June 2, 2004

Amendments to the Claims:

Claims 1-12 (canceled)

13. (original) A method of making an image sensor device, comprising the steps of:

providing a QFN type leadframe having a central die attach flag and an outer bonding pad area having a plurality of bonding pads, wherein the flag has a perimeter ring that forms a bond line having a height that is about the same as a thickness of the leadframe;

disposing a die attach material on the flag and within the perimeter ring;

attaching a sensor integrated circuit (IC) to the flag with the die attach material, the IC having a first surface with an active area and a peripheral bonding pad area, the peripheral bonding pad area including bonding pads;

electrically connecting respective ones of the IC bonding pads and corresponding ones of the leadframe bonding pads with a plurality of wires via wirebonding;

forming a plurality of stud bumps on the first surface of the IC;

placing a transparent cover over the IC active area such that the cover rests on the stud bumps, wherein light may pass through the cover and onto the IC active area; and

forming a mold compound over the leadframe, wirebonds and a peripheral portion of the cover.

14. (original) The method of making an image sensor device of claim 13, wherein the stud bumps are formed of gold and have a height of about 3 mils.

15. (original) The method of making an image sensor device of claim 14, wherein the wires are gold.

16. (original) The method of making an image sensor device of claim 13, further comprising the step of:

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dispensing a clear compound over the IC active area prior to placing the cover on the stud bumps, wherein the compound thickness is about the same as a height of the stud bumps.

17. (original) The method of making an image sensor device of claim 16, wherein the cover comprises glass.

18. (original) The method of making an image sensor device of claim 13, further comprising the step of:

after attaching the IC to the flag, placing the leadframe on a stage curing heat block having a vacuum hole at a central position under the flag.

19. (original) The method of making an image sensor device of claim 18, further comprising the steps of:

initiating a vacuum force that causes the die attach material to collapse into the hole; and

curing the die attach material.

20. (original) The method of making an image sensor device of claim 19, wherein the vacuum force collapsing the die attach material into the hole and the curing step form a bump that protrudes from the die attach material.

21. (original) The method of making an image sensor device of claim 20, further comprising the step of:

after forming the mold compound over the leadframe, wirebonds and the peripheral portion of the cover, collapsing the bump to cause a force for maintaining the cover in contact with a mold cavity.

22. (original) A method of making an image sensor device, comprising the steps of:

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providing a QFN type leadframe having a central die attach flag and an outer bonding pad area having a plurality of bonding pads, wherein the flag has a perimeter ring that forms a bond line having a height that is about the same as a thickness of the leadframe;

disposing a die attach material on the flag and within the perimeter ring;

attaching a sensor integrated circuit (IC) to the flag with the die attach material, the IC having a first surface with an active area and a peripheral bonding pad area, the peripheral bonding pad area including bonding pads;

placing the leadframe on a stage curing heat block having a vacuum hole at a central position under the flag;

electrically connecting respective ones of the IC bonding pads and corresponding ones of the leadframe bonding pads with a plurality of wires via wirebonding;

dispensing a clear compound over the IC active area;

placing a transparent cover over the clear compound on the IC active area, wherein light may pass through the cover and the compound and onto the IC active area; and

forming a mold compound over the leadframe, wirebonds and a peripheral portion of the cover.

23. (original) The method of making an image sensor device of claim 22, further comprising the steps of:

initiating a vacuum force that causes the die attach material to collapse into the hole; and

curing the die attach material.

24. (original) The method of making an image sensor device of claim 23, wherein the vacuum force collapsing the die attach material into the hole and the curing step form a bump that protrudes from the die attach material.

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25. (original) The method of making an image sensor device of claim 24, further comprising the step of:

after forming the mold compound over the leadframe, wirebonds and the peripheral portion of the cover, collapsing the bump to cause a force for maintaining the cover in contact with a mold cavity.